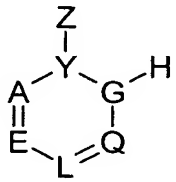
We claim:

1. A process for free-radical polymerization in the presence of a regulator, which comprises using, as regulator, carbocyclic or heterocyclic compounds which contain a leaving group in the allyl or heteroallyl position, or homoallyl or homoheteroallyl position, respectively, where these compounds, following free-radical hydrogen abstraction, form an aromatic system with elimination of a free-radical leaving group.

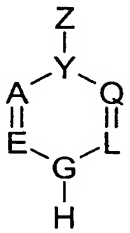
2. A process as claimed in claim 1, wherein the aromatic system which forms is an optionally substituted phenyl, pyridine, pyridazine, pyrimidine, pyrazine, pyran, thiopyran, pyrrole, pyrazole, imidazole, furan, oxazole, isoxazole, thiophene, thiazol or isothiazol.

3. A process as claimed in claim 1, wherein the leaving group is a carboxylate, silyl, sulfonyl, aryl, benzyl, allyl or alkyl group.

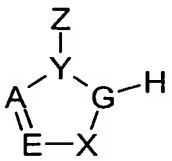
4. A process as claimed in claims 1 to 3, wherein the regulator chosen is at least one compound from the formulae (I), (II), (III) or (IV)



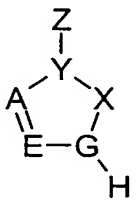
(I)



(II)



(III)



(IV)

in which

A	is C-R^1, N,
E	is C-R^2, N,
L	is C-R^3, N,
Q	is C-R^4, N,

where

R^1-R^4	independently of one another are hydrogen, C_1-C_{10}-alkyl, C_1-C_{10}-alkoxy, C_1-C_{10}-alkylamino, C_2-C_{20}-dialkylamino, C_1-C_{10}-alkylcarbonyl, C_1-C_{10}-alkylsulfonyl, C_2-C_{10}-alkenyl, C_2-C_{10}-alkynyl, in which at least two of the radicals R^1-R^4 may be joined together to give a 3- to 8-membered ring,

	G	is C-R^5, N,
	where R^5	is hydrogen, C_1-C_{10}-alkyl,
	X	is O, N-R^6, S,
	where R^6	is hydrogen, C_1-C_{10}-alkoxy, C_1-C_{10}-alkylamino, C_2-C_{20}-dialkylamino, C_1-C_{10}-alkylcarbonyl, C_1-C_{10}-alkylsulfonyl,
	Y	is C-R^7, N,
	where R^7	is hydrogen, carboxyl, C_1-C_{10}-alkyl, C_1-C_{10}-alkoxy, C_1-C_{10}-alkylcarbonyl, C_1-C_{10}-alkoxycarbonyl, C_1-C_{10}-alkylaminocarbonyl, C_2-C_{20}-dialkylaminocarbonyl, C_1-C_{10}-alkylcarbonyloxy, C_1-C_{10}-alkylcarbonylamino, C_1-C_{10}-alkylsulfonyl, C_1-C_{10}-alkoxysulfonyl, C_1-C_{10}-alkylaminosulfonyl, C_2-C_{20}-dialkylaminosulfonyl, C_1-C_{10}-acyl, C_2-C_{10}-alkenyl, C_3-C_{10}-alkenyloxy, C_2-C_{10}-alkenylcarbonyl, C_3-C_{10}-alkenyloxycarbonyl, C_3-C_{10}-alkenylaminocarbonyl, C_2-C_{10}-alkenylcarbonyloxy, C_2-C_{10}-alkenylcarbonylamino, C_2-C_{10}-alkenylsulfonyl, C_3-C_{10}-alkenyloxysulfonyl, C_3-C_{10}-alkenylaminosulfonyl, C_2-C_{10}-alkynyl, C_3-C_{10}-alkynyloxy, C_2-C_{10}-alkynylcarbonyl, C_3-C_{10}-alkynyloxycarbonyl, C_3-C_{10}-alkynylaminocarbonyl, C_2-C_{10}-alkynylcarbonyloxy, C_2-C_{10}-alkynylcarbonylamino, C_2-C_{10}-alkynylsulfonyl, C_3-C_{10}-alkynyloxysulfonyl, C_3-C_{10}-alkynylaminosulfonyl, C_3-C_{12}-cycloalkyl, C_3-C_{12}-cycloalkoxy, C_3-C_{12}-cycloalkylcarbonyl, C_3-C_{12}-cycloalkoxycarbonyl, C_3-C_{12}-cycloalkylaminocarbonyl, C_3-C_{12}-cycloalkylcarbonyloxy, C_3-C_{12}-cycloalkylcarbonylamino, C_3-C_{12}-cycloalkylsulfonyl, C_3-C_{12}-cycloalkoxysulfonyl, C_3-C_{12}-cycloalkylaminosulfonyl, aryl, aryloxy, arylcarbonyl, aryloxycarbonyl, arylaminocarbonyl, arylcarbonyloxy, arylcarbonylamino, arylsulfonyl, aryloxysulfonyl, arylaminosulfonyl,
	Z	is $COOR^8$, $SiR^9R^{10}R^{11}$, SO_2R^{12}, aryl, optionally substituted benzyl, C_3-C_{10}-2-alken-1-yl, R^{13}
	where	
	R^8, R^{13}	are C_1-C_{10}-alkyl,
	R^9-R^{11}	independently of one another are hydrogen, C_1-C_{10}-alkyl, in which two of the radicals R^9-R^{11} may be joined together to give a 3- to 8-

membered ring,

R^{12} is hydrogen, C_1-C_{10}-alkyl,

with the proviso that a maximum of 2 heteroatoms are in the ring of the heterocyclic compound.

5. A process as claimed in claims 1 to 4, wherein the regulator used is cyclohexadienecarboxylic acid optionally substituted by C_1-C_4-alkyl radicals as R^7, methyl cyclohexadienecarboxylate, ethyl cyclohexadienecarboxylate, dihydrofurancarboxylic acid, methyl dihydrofurancarboxylate and/or ethyl dihydrofurancarboxylate.

6. A process as claimed in claims 1 to 5, wherein the regulator used is methyl 1-methyl-2,5-cyclohexadiene-1-carboxylate, 1-isopropyl-2,5-cyclohexadiene-1-carboxylic acid, 1-tert-butyl-2,5-cyclohexadiene-1-carboxylic acid, 1-benzyl-2,5-cyclohexadiene-1-carboxylic acid, 1-allyl-2,5-cyclohexadiene-1-carboxylic acid and/or 1-cyanomethyl-2,5-cyclohexadiene-1-carboxylic acid.

7. A process as claimed in claims 1 to 6, wherein 0.01 to 5% by weight of regulator, based on the total amount of monomers, is used.

8. A process as claimed in claims 1 to 7, wherein the regulator is used in emulsion, micro emulsion, miniemulsion, suspension, microsuspension, minisuspension, precipitation, bulk and/or in solution polymerizations.

9. A process as claimed in claims 1 to 8, wherein homopolymers and/or copolymers are prepared.

10. A process as claimed in claims 1 to 9, wherein the free-radically polymerizable monomers used are monoethylenically unsaturated C_3-C_6-carboxylic acids, C_1-C_{20}-(meth)acrylic esters, amides and nitriles, vinyl esters of carboxylic acids containing up to 20 carbon atoms, vinylaromatics having up to 20 carbon atoms, vinyl halides, vinyl ethers of alcohols containing 1 to 10 carbon atoms, aliphatic optionally halogenated hydrocarbons having 2 to 8 carbon atoms and 1 or 2 double bonds, open-chain N-vinylamide compounds, vinylidenes or mixtures of these monomers.

11. The use of the compounds of the formulae (I), (II), (III) or (IV) as claimed in claim 3 as regulators for free-radical polymerization reactions.